example, as a coating onto an underlying layer or porous substrate. It is also possible to laminate. A variety of materials can be used, including a wide range of polymeric compositions including polyolefins such as Tyvek® polyolefin (DuPont, Wilmington, DE).

The term "nanofiber" refers to elongated structures having a cross-section (angular fibers having edges) or diameter (rounded) less than 1 micron. The term "microfiber" refers to fibers with diameter larger than 1 micron, but not larger than 10 microns. This fine fiber can be made in the form of an improved single or multi-layer microfiber structure. Such fine-fiber layers can comprise a random distribution of fine fibers which can be bonded to form an interlocking net. Pigment trapping can be obtained largely as a result of the fine-fiber barrier to the passage of pigment particles. The fine-fiber interlocking networks have relatively small spaces between the fibers. Such spaces typically range, between fibers, from about 0.01 to about 25 microns or often about 0.1 to about 10 microns. Preferably, the fine fiber adds less than 3 microns in thickness to the overall inkjet media.

Polymer materials that can be used in the polymeric compositions of the nanofiber or microfiber include both addition polymer and condensation polymer materials such as polyolefin, polyacetal, polyamide, polyester, polyalkylene sulfide, polyarylene oxide, polysulfone, modified polysulfone polymers and mixtures thereof. Preferred materials that fall within these generic classes include polyethylene, polypropylene, poly(vinylchloride), polymethylmethacrylate (and other acrylic resins), polystyrene, and copolymers thereof (including ABA type block copolymers), poly(vinylidene fluoride), poly(vinylidene chloride), polyvinylalcohol in various degrees of hydrolysis in crosslinked and non-crosslinked forms.

In another embodiment, the surface layer or material for the ink-receiving layer can comprise a voided polymeric film which is voided by inorganic or organic particles. The voiding process is often accomplished by uniaxial or biaxial orientation. See, for example, U.S. Patent No. 6,489,008 to Campbell, hereby incorporated by reference in its entirety and USSN ~~(Docket No.~~ 10/722,886

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~~86688)~~ to Laney et al., also hereby incorporated by reference. Preferably, in the case of an open-cell voided polymeric material, the material comprises a polyester or polyolefin or copolymers thereof. An example of an open-cell voided copolymer film is a voided polyester film such as described in U.S. Patent No.6,409,334. This porous polyester base unit layer can be coextruded with a non-voided polyester support layer if desired for additional support.

In still another embodiment, the surface layer can comprise a foamed film, for example, comprising a foamed polyethylene material. See, for example, U.S. Patent Nos. 5,869,544; 5,677,355; and 6,353,037; relating to examples of various techniques for open-cell foaming, which patents are hereby incorporated by reference in their entirety.

In yet another embodiment, the surface layer comprises a microporous material made from polymeric films filled with porous, usually inorganic particles. For example, U.S. Patent No. 5,605,750, hereby incorporated by reference, describes a microporous material that comprises siliceous filler particles distributed throughout a matrix of a thermoplastic organic polymer, for example, a polyolefin such as polyethylene or polypropylene. Similar materials are described in U.S. Patent No. 6,025,068 to Pekala, in which the organic polymer comprises a poly(ethylene oxide) and a crosslinkable urethane-acrylic hybrid polymer; and in U.S. Patent No. 5,326,391 to Anderson et al., in which the organic material comprises essentially linear ultrahigh molecular weight olefin such as polyethylene filled with silica particles, both patents hereby incorporated by reference in their entirety.

In another embodiment of the invention, the surface layer or material for the ink-receiving layer can comprise organic polymeric beads, for example, as described in U.S. Patent No. 6,497,480 to Wexler, which beads are fusible after printing of the image. In this case the ink-receiving or upper layer receives the ink only temporarily and does not retain the ink, which is essentially transported to a lower ink-retaining layer, after which the beads are fused.

In addition to the primary material used in the surface layer, the surface layer can further comprise a mordant for providing pigment affinity for the

The support for the inkjet recording element used in the invention can be any of those usually used for inkjet receivers, such as resin-coated paper, polyesters, laminated papers such as biaxially oriented support laminates, and polyolefin, e.g. polypropylene films. The supports may also be porous in nature with interconnecting voids such as paper, Tyvek® synthetic paper (DuPont Corp.), biaxially oriented and voided polyester films, and Teslin® SP synthetic printing sheet (PPG Industries Inc.).

The support used in the invention may have a thickness of from about 50 to about 500 microns, preferably from about 75 to about 300 microns. Antioxidants, antistatic agents, plasticizers and other known additives may be incorporated into the support, if desired.

After coating, the inkjet recording element may be subject to calendering or supercalendering to enhance surface smoothness.

Inkjet inks used to image the recording elements of the present invention are well known in the art. The ink compositions used in inkjet printing typically are liquid compositions comprising a solvent or carrier liquid, dyes or pigments, humectants, organic solvents, detergents, thickeners, preservatives, and the like. The solvent or carrier liquid can be solely water or can be water mixed with other water-miscible solvents such as polyhydric alcohols. Inks in which organic materials such as polyhydric alcohols are the predominant carrier or solvent liquid may also be used. Particularly useful are mixed solvents of water and polyhydric alcohols. The dyes used in such compositions are typically water-soluble direct or acid type dyes. Such liquid compositions have been described extensively in the prior art including, for example, U.S. Patent Nos. 4,381,946; 4,239,543; and 4,781,758, the disclosures of which are hereby incorporated by reference.

In a preferred embodiment of a printing process according to one aspect of the invention, at least one pigment is used to print an image on the inkjet recording element. The pigment used in the current invention can be either self-dispersible pigments such as those described in U.S. Patent No. 5,630,868, encapsulated pigments as those described in the ~~pending~~ U.S. Patent Application

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Serial No. 09/822,723; or can be stabilized by a dispersant. The process of preparing inks from pigments commonly involves two steps: (a) a dispersing or milling step to break up the pigment to the primary particle; and (b) a dilution step in which the dispersed pigment concentrate is diluted with a carrier and other addenda to a working strength ink. In the milling step, the pigment is usually suspended in a carrier (typically the same carrier as that in the finished ink) along with rigid, inert milling media. Mechanical energy is supplied to this pigment dispersion, and the collisions between the milling media and the pigment cause the pigment to deaggregate into its primary particles. A dispersant or stabilizer, or both, is commonly added to the pigment dispersion to facilitate the deaggregation of the raw pigment, to maintain colloidal particle stability, and to retard particle reagglomeration and settling.

Pigments which may be used in the invention include organic and inorganic pigments, alone or in combination, such as those as disclosed, for example in U.S. Patent Nos. 5,026,427; 5,086,698; 5,141,556; 5,160,370; and 5,169,436. The exact choice of pigments will depend upon the specific application and performance requirements such as color reproduction and image stability. Pigments suitable for use in the present invention include, for example, azo pigments, monoazo pigments, disazo pigments, azo pigment lakes, β-Naphthol pigments, Naphthol AS pigments, benzimidazolone pigments, disazo condensation pigments, metal complex pigments, isoindolinone and isoindoline pigments, polycyclic pigments, phthalocyanine pigments, quinacridone pigments, perylene and perinone pigments, thioindigo pigments, anthrapyrimidone pigments, flavanthrone pigments, anthanthrone pigments, dioxazine pigments, triarylcarbonium pigments, quinophthalone pigments, diketopyrrolo pyrrole pigments, titanium oxide, iron oxide, and carbon black. Typical examples of pigments which may be used include Color Index (C. I.) Pigment Yellow 1, 2, 3, 5, 6, 10, 12, 13, 14, 16, 17, 62, 65, 73, 74, 75, 81, 83, 87, 90, 93, 94, 95, 97, 98, 99, 100, 101, 104, 106, 108, 109, 110, 111, 113, 114, 116, 117, 120, 121, 123, 124, 126, 127, 128, 129, 130, 133, 136, 138, 139, 147, 148, 150, 151, 152, 153, 154, 155, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 179,